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資料 Data

A Checklist of the Monogeneans (Platyhelminthes) Parasitic on Fishes and Invertebrates of the Seto Inland Sea, Japan (1894-2015), with New Locality Records for *Anoplodiscus spari* (Anoplodiscidae) and *Dactylogyryus gotoi* (Dactylogyridae)

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Abstract: Information on the monogeneans parasitic on fishes and invertebrates of the Seto Inland Sea published between the years 1894 and 2015 with two new records is assembled as Parasite-Host and Host-Parasite lists. A total of 54 species (52 species from fishes and 2 species from invertebrates) of the following families have been reported: Monocotylidae (3 species), Capsalidae (6), Anoplodiscidae (1), Udonellidae (1), Dactylogyridae (2), Ancylocephalidae (6), Diplectanidae (11), Hexabothriidae (1), Mazocraeidae (1), Diclidophoridae (7), Plectanocotylidae (1), Bychowskicotylidae (1), Gastrocotylidae (1), Axinidae (3), Heteraxinidae (2), and Microcotylidae (7). *Anoplodiscus spari* and *Dactylogyryus gotoi* are herein reported for the first time from the Seto Inland Sea off Hiroshima Prefecture.

Keywords: Monogenea, Parasites, Seto Inland Sea, New records

Ⅰ. Introduction

The Seto Inland Sea (Fig. 1) is the largest inland sea in Japan and lies between the three main islands (Honshu, Shikoku, and Kyushu). The surface area of the sea is approximately 20×10^3 km^2 (450 km long and 15-55 km wide) with 37 m in average depth (Okaichi and Itami, 1985). It is connected to the North Pacific Ocean through two channels, the Kii Channel (Fig. 1A) and the Bungo Channel (Fig. 1B), and the Sea of Japan through the Kanmon Strait (Fig. 1C).

As of the year 2015, we have over 120-year history of study on the monogeneans parasitic on fishes and invertebrates in the Seto Inland Sea. In 1894, Seitaro Goto first reported fish monogeneans from this sea (Goto, 1894). Later, Satyu Yamaguti described monogeneans from fishes of the sea during the 1930s to 1950s (Yamaguti, 1934, 1937, 1938, 1940, 1958). Based on the papers published by these two scientists, Inaba (1988) listed 34 species of monogeneans in the monograph entitled “Fauna and Flora of the Seto Inland Sea”. This list, however, lacked some species of monogeneans due to insufficient literature search. Subsequently, especially since the 1960s, many monogeneans of cultured and commercially important fishes have been reported from the Seto Inland Sea. In addition, two species of monogeneans were newly found during our current investigation and are included in this checklist. Thus, the present checklist contains information on 54 species of monogeneans (52 species from fishes and 2 species from invertebrates), which belong to 16 families: Monocotylidae (3 species), Capsalidae (6), Anoplodiscidae (1), Udonellidae (1), Dactylogyridae (2), Ancylocephalidae (6), Diplectanidae (11), Hexabothriidae (1), Mazocraeidae (1), Diclidophoridae (7), Plectanocotylidae (1), Bychowskicotylidae (1), Gastrocotylidae (1), Axinidae (3), Heteraxinidae (2), and Microcotylidae (7).

In this checklist, information on the monogeneans is assembled as Parasite-Host and Host-Parasite lists. In the Parasite-Host List, the classification of monogeneans follows Gibson (2015). For each species of monogeneans, the following information is provided: 1) the current *scientific name*, including the original author(s) and date with the authority of the combination, followed by any recognized *synonym*(*s*) (as Syn. or Syns.) used in establishing the record(s) in the Seto Inland Sea; 2) *Site*(*s*) of occurrence of the parasite on its host(s); 3) *Host*(*s*), in which currently accepted scientific names are given: for fish hosts, the names recommended by Froese and Pauly (2015) are used. The scientific names used in

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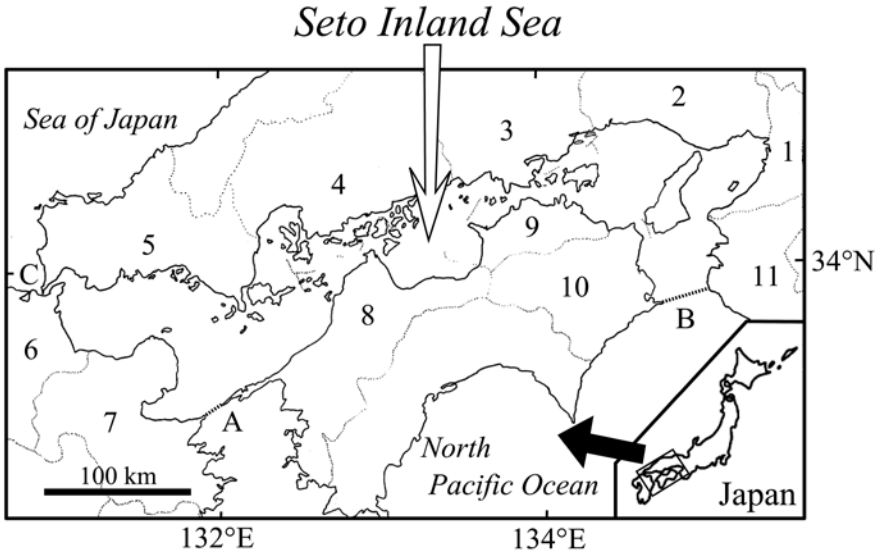

Fig. 1 A map of the Seto Inland Sea (SIS), western Japan. A, a boundary in the Kii Channel between SIS and the North Pacific Ocean (NPO); B, a boundary in the Bungo Channel between SIS and NPO; C, a boundary near the Kanmon Strait between SIS and the Sea of Japan. Eleven prefectures surround the Seto Inland Sea (1, Osaka; 2, Hyogo; 3, Okayama; 4, Hiroshima; 5, Yamaguchi; 6, Fukuoka; 7, Oita; 8, Ehime; 9, Kagawa; 10, Tokushima; 11, Wakayama), and prefectural boundaries are shown by dotted lines.

the original reports are shown in parentheses. A Japanese common name is also given in Japanese in parentheses for each host species after its scientific name; 4) *Record*(*s*), in which the authors responsible for the records are listed in chronological order. Each reference is followed by the locality or localities given in two parts (the detailed collection locality or localities from which the parasite was reported, and then the prefecture(s) with number(s) shown in Fig. 1); and 5) *Remarks*, where explanatory comments are offered on nomenclature and notes such as questionable host identifications in original reports. In the Host-Parasite List, the genera and species of hosts are listed in alphabetical order within each of higher taxa of animals (Copepoda, Isopoda, Elasmobranchii, and Actinopterygii). After the name of each host species, monogenean(s) is (are) listed in systematic order shown in the Parasite-Host List. Information on the site(s) of occurrence and the prefecture(s) is also given for each monogenean species.

This checklist is the third in the series of published synopsis for the parasites of fishes and invertebrates of the Seto Inland Sea (Nagasawa, 2011, 2015 for the parasitic copepods).

Ⅱ. Parasite-Host List

Class Monogenea van Beneden, 1858
Subclass Monopisthocotylea Odhner, 1912
Order Monocotylidea Lebedev, 1988
Family Monocotylidae Taschenberg, 1879

Calicotyle mitsukurii Goto, 1894
Site: cloaca
Host: *Squatina japonica* (as *Rhina* sp., カスザメ)
Record: Goto 1894 (Mitsugahama, Ehime [8])
Remarks: Goto (1894) recorded the Japanese name of the host ("*Rhina* sp.?") as "Katasahi-zamé", and this name is an old local name of *Squatina japonica* (Tamura 1935; Nitta and Nagasawa 2015).

Heterocotyle chinensis Timofeeva, 1983
Site: gills
Host: *Dasyatis akajei* (アカエイ)
Record: Nitta and Nagasawa 2015 (mouth of Kamo River; off Osaki-kami-jima, Hiroshima [4])

Monocotyle ijimae Goto, 1894
Site: mouth cavity
Host: *Dasyatis akajei* (as *Trygon pastinaca*, アカエイ)

Record: Goto 1894 (Ujina Port, Hiroshima [4])

Order Capsalidea Lebedev, 1988
Family Capsalidae Baird, 1853

Allobedenenia convoluta (Yamaguti, 1937) Yamaguti, 1963

Syn.: *Epibdella* (*Benedenia*) *convoluta* Yamaguti, 1937

Site: gills

Host: *Epinephelus akaara* (キジハタ)

Record: Yamaguti 1937 (unspecified locality, Seto Inland Sea)

Benedenia epinepheli (Yamaguti, 1937) Meserve, 1938

Syns.: *Epibdella* (*Epibdella*) *epinepheli* Yamaguti, 1937; *Neobenedeniella congeri* (Yamaguti, 1958)

Sites: gills, fins, eyes, body surface

Hosts: *Epinephelus akaara* (キジハタ: Tarumi, Hyogo), *Conger myriaster* (マアナゴ: unspecified locality, Seto Inland Sea), *Paralichthys olivaceus* (ヒラメ: unspecified locality, Ehime)

Records: Yamaguti 1937 (Tarumi, Hyogo [2]); Yamaguti 1958 (unspecified locality, Seto Inland Sea); Ogawa et al. 1995 (unspecified locality, Ehime [8])

Remarks: *Neobenedeniella congeri* was synonymized with *Benedenia epinepheli* by Ogawa et al. (1995).

Benedenia sekii (Yamaguti, 1937) Meserve, 1938

Syn.: *Epibdella* (*Epibdella*) *sekii* Yamaguti, 1937

Site: body surface

Host: *Pagrus major* (as *Pagrosomus unicolor*, マダイ)

Record: Yamaguti 1937 (Hiroshima Fisheries Experimental Station at Otyo, Hiroshima [4])

Benedenia seriolae (Yamaguti, 1934) Price, 1939

Syn.: *Epibdella seriolae* Yamaguti, 1934

Site: gills

Host: *Seriola lalandi* (as *Seriola aureovittata*, ヒラマサ)

Record: Yamaguti 1934 (unspecified locality, Seto Inland Sea)

Encotyllabe spari Yamaguti, 1934

Site: gills

Hosts: *Acanthopagrus schlegelii* (as *Sparus macrocephalus*, クロダイ), *Diagramma pictum* (as *Plectorhynchus pictus*, コロダイ), *Epinephelus akaara* (キジハタ)

Record: Yamaguti 1934 (unspecified locality, Seto Inland Sea)

Metabenedeniella hoplognathi (Yamaguti, 1942) Yamaguti, 1963

Syns.: *Epibdella* (*Benedenia*) *hoplognathi* Yamaguti, 1942; *Metabenedeniella hoplognathi* Yamaguti, 1958.

Site: gills

Hosts: *Oplegnathus punctatus* (as *Hoplognathus punctatus*, イシガキダイ: unspecified locality, Tokushima), *Oplegnathus fasciatus* (as *Hoplognathus fasciata*, イシダイ: Suma Aquarium Park, Hyogo), *Epinephelus septemfasciatus* (マハタ: Suma Aquarium Park, Hyogo)

Records: Yamaguti 1942 (unspecified locality, Tokushima [10]); Yamaguti 1958 (Suma Aquarium Park, Hyogo [2])

Order Gyrodactylidea Bychowsky, 1937
Family Anoplodiscidae Tagliani, 1912

Anoplodiscus spari (Yamaguti, 1958) Ogawa and Egusa, 1981

Site: fins

Host: *Acanthopagrus schlegelii* (クロダイ)

Record: this paper (Hiroshima Bay, Hiroshima [4])

Remarks: This species was originally described by Yamaguti (1958) as *Pseudomicrobothrium spari* from *Acanthopagrus schlegelii* (as *Sparus macrocephalus*) in Sagami Bay, Japan, and later redescribed from the same host species in Shizuoka Prefecture by Ogawa and Egusa (1981). The specimens of the species (Fig. 2, NSMT-Pl 6183, n=5) were collected from the pectoral fin of *A. schlegelii* in Hiroshima Bay, Hiroshima Prefecture, on 14 February 2012, which represents the first record of the monogenean from the sea. The body (Fig. 2A) is fusiform (1769-2684 × 1056-1528 μm), the intestine has many side branches, and the haptor lacks sclerotized parts. The male copulatory organ (Fig. 2B) consists of a looping cirrus (624-739 μm long) and an accessory piece (204-230 μm long) which has a branched distal end and a three-hooked proximal end. These features of the specimens examined in this paper are identical to those of descriptions of the species by Yamaguti (1958) and Ogawa and Egusa (1981).

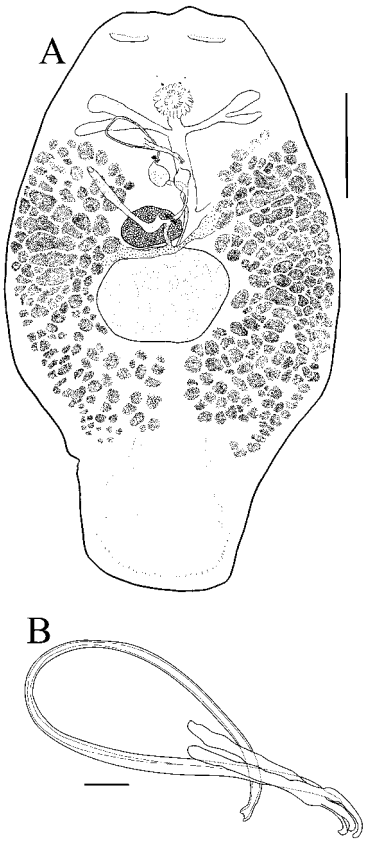

Fig. 2 *Anoplodiscus spari* (Yamaguti, 1958) Ogawa and Egusa, 1981, NSMT-Pl 6183. A, whole body (ventral view); B, male copulatory organ. Scale bars: A, 500 μm; B, 50 μm.

Family Udonellidae Taschenberg, 1879

Udonella fugu Freeman and Ogawa, 2010

Site: body surface

Host: *Caligus fugu* (as *Pseudocaligus fugu*, セトウオジラミ) on *Takifugu niphobles* (クサフグ)

Record: Okawachi et al. 2012 (Takehara off the Takehara Marine Science Station, Hiroshima [4])

Order Dactylogyridea Bychowsky, 1937

Family Dactylogyridae Bychowsky, 1933

Dactylogyrus inversus Goto and Kikuchi, 1917

Syn.: *Microncotrema lateolabracis* Yamaguti, 1958

Site: gills

Host: *Lateolabrax japonicus* (スズキ)

Records: Yamaguti 1938 (Tarumi, Hyogo [2]); Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Dactylogyrus gotoi Gussev, 1963

Site: gills

Host: *Lateolabrax japonicus* (スズキ)

Record: this paper (Kure, Nagahama Port, Hiroshima [4])

Remarks: This species was originally described by Gussev (1963) from *Lateolabrax maculatus* (as *L. japonicus*) in the Liaohe River and the Yellow Sea, China, and later redescribed by Nitta and Nagasawa (2014) from *L. japonicus* in Lake Nakaumi and Lake Shinji, Shimane Prefecture, Japan. The specimens of the species (Fig. 3, NSMT-Pl 6184, n=5) were collected from the gills of *L. japonicus* in Nagahama Port (34°12’43″N, 132°37’15″E), Kure City, Hiroshima Prefecture, on 9 April 2013, which represents the first record of the monogenean from the sea. The haptor consists of a pair of anchors (Fig. 3A), a rod-shaped dorsal bar (Fig. 3B), a cup-shaped ventral bar (Fig. 3C), seven pairs of marginal hooks (Fig. 3D-J), and a pair of needles (Fig. 3K). The male copulatory organ (Fig. 3L) consists of a slender, curved cirrus, and an accessory

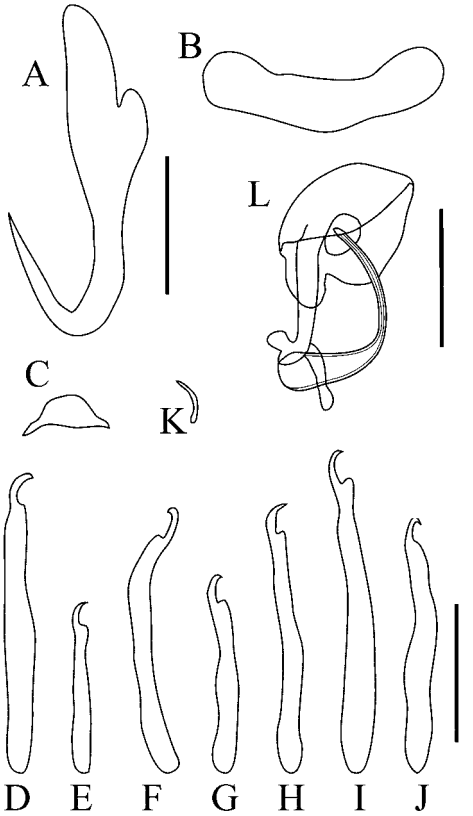

Fig. 3 *Dactylogyrus gotoi* Gussev, 1963, NSMT-Pl 6184. A, anchor; B, dorsal bar; C, ventral bar; D, marginal hook of pair I; E, marginal hook of pair II; F, marginal hook of pair III; G, marginal hook of pair IV; H, marginal hook of pair V; I, marginal hook of pair VI; J, marginal hook of pair VII; K, needle; L, male copulatory organ. Scale bars: 20 μm.

piece which has a bifurcate base and a hood-like apical part with a hole for the tip of the cirrus. The specimens examined in this paper conform to the descriptions and illustrations of *D. gotoi* provided by Gussev (1963) and Nitta and Nagasawa (2014).

Family Ancyrocephalidae (sensu lato) Bychowsky and Nagibina, 1968

Haliotrema japonense Yamaguti, 1934
Site: gills
Host: *Parupeneus chrysopleuron* (as *Pseudupeneus chrysopleuron*, ウミヒゴイ)
Record: Yamaguti 1934 (unspecified locality, Seto Inland Sea)

Haliotrema kurodai Ogawa and Egusa, 1978
Site: gills
Host: *Acanthopagrus schlegelii* (クロダイ)
Record: Ogawa and Egusa 1978b (Nansei National Fisheries Research Institute at Ohno, Hiroshima [4])

Lethrinitrema lethrini (Yamaguti, 1937) Lim and Justine, 2011
Syn.: *Ancyrocephalus lethrini* Yamaguti, 1937
Site: gills
Host: *Lethrinus haernatopterus* (フエフキダイ)
Record: Yamaguti 1937 (Tarumi, Hyogo [2])

Pseudamphibdella paralichthydis Yamaguti, 1958
Site: gills
Host: *Paralichthys olivaceus* (ヒラメ)
Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Pseudohaliotrema thysanophrydis (Yamaguti, 1937) Young, 1968
Syn.: *Ancyrocephalus thysanophrydis* Yamaguti, 1937
Site: gills
Host: *Inegocia japonica* (as *Thysanophrys japonicus,* イネゴチ)
Record: Yamaguti 1937 (Tarumi, Hyogo [2])

Tetrancistrum sigani Goto and Kikuchi, 1917
Site: gills
Host: *Siganus fuscescens* (アイゴ)
Record: Yamaguti 1938 (Tarumi, Hyogo [2])

Family Diplectanidae Monticelli, 1903

Lamellodiscus japonicus Ogawa and Egusa, 1978
Site: gills
Host: *Acanthopagrus schlegelii* (クロダイ)
Record: Ogawa and Egusa 1978a (farms, Hiroshima [4])

Lamellodiscus pagrosomi Murray, 1931
Site: gills
Host: *Pagrus major* (as *Pagrosomus unicolor*, マダイ)
Record: Yamaguti 1934, 1938 (Tarumi, Hyogo [2])

Lamellodiscus spari Zhukov, 1970
Site: gills
Host: *Acanthopagrus schlegelii* (クロダイ)
Record: Ogawa and Egusa 1978a (farms, Hiroshima [4])

Lamellodiscus takitai Ogawa and Egusa, 1978
Site: gills
Host: *Acanthopagrus schlegelii* (クロダイ)
Record: Ogawa and Egusa 1978a (farms, Hiroshima [4])

Lepidotrema longipenis (Yamaguti, 1934) Kritsky, Jiménez-Ruiz and Sey, 2000
Syn.: *Squamodiscns longipenis* Yamaguti, 1934
Site: gills
Host: *Rhyncopelates oxyrhynchus* (as *Therapon oxyrhynchus*, シマイサキ)
Record: Yamaguti 1934 (Tarumi, Hyogo [2])

Lobotrema spari (Yamaguti, 1958) Oliver, 1987
Syn.: *Pseudomurraytrema spari* Yamagiti, 1958
Site: gills
Hosts: *Acanthopagrus schlegelii* (as *Sparus macrocephalus*, クロダイ)
Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Murraytrematoides ditrematis Yamaguti, 1958
Site: gills
Host: *Ditrema temmincki* (ウミタナゴ)

Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Murraytrematoides lateolabracis (Yamaguti, 1958) Oliver, 1987

Syn.: *Geneticoenteron lateolabracis* Yamaguti, 1958

Site: gills

Host: *Lateolabrax japonicus* (スズキ)

Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Remarks: Nitta and Nagasawa (2014) listed this species as *Geneticoenteron lateolabracis*, but it had been transferred to the genus *Murraytrematoides* by Oliver (1987).

Pseudorhabdosynochus epinepheli (Yamaguti, 1938) Kritsky and Beverley-Burton, 1986

Syn.: *Diplectanum epinepheli* Yamaguti, 1938; *Pseudorhabdosynochus epinepheli* Yamaguti, 1958

Site: gills

Host: *Epinephelus akaara* (キジハタ)

Records: Yamaguti 1938, 1958 (unspecified locality, Seto Inland Sea); Isshiki et al. 2007 (Sea-Farming Center at Yashima, Kagawa [9])

Remarks: Kritsky and Beverly-Burton (1986) transferred *Diplectanum epinepheli* Yamaguti, 1938 to the genus *Pseudorhabdosynochus* and regarded *Pseudorhabdosynochus epinepheli* Yamaguti, 1958 as a junior synonym of *Pseudorhabdosynochus epinepheli* (Yamaguti, 1938).

Pseudorhabdosynochus lantauensis (Beverley-Burton and Suriano, 1981) Kritsky and Beverley-Burton, 1986

Site: gills

Host: *Epinephelus akaara* (キジハタ)

Record: Justine 2009 (Tarumi, Hyogo [2])

Remarks: Two specimens of this species deposited in the Meguro Parasitological Museum, Tokyo, were identified by Justine (2009).

Pseudorhabdosynochus satyui Justine, 2009

Site: gills

Host: *Epinephelus akaara* (キジハタ)

Record: Justine 2009 (Tarumi, Hyogo [2])

Remarks: This species was originally described by Justine (2009) using two specimens deposited in the Meguro Parasitological Museum, Tokyo.

Subclass Polyopisthocotylea Odhner, 1912

Order Diclybothriidea Bychowsky, 1957

Family Hexabothriidae Price, 1942

Squaloncocotyle laymani Yamaguti, 1958

Site: gills

Host: *Mustelus manazo* (ホシザメ)

Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Order Mazocraeidea Bychowsky, 1937

Family Mazocraeidae Price, 1936

Pseudanthocotyloides sp.

Site: gills

Host: *Engraulis japonica* (カタクチイワシ)

Record: Yamamoto et al. 1984 (Iyo-nada, Ehime [8])

Family Diclidophoridae Fuhrmann, 1928

Choricotyle elongata (Goto 1894) Llewellyn, 1941

Syn.: *Diclidophora elongata* Goto, 1894

Hosts and sites: Dorsal surface of *Meinertia oxyrhynchaena* (ソコウオノエ) in mouth cavity of *Pagrus major* (as *Pagrosomus unicolor*, マダイ)

Record: Yamaguti 1938 (unspecified locality, Seto Inland Sea)

Remarks: *Meinertia oxyrhynchaena* reported by Yamaguti (1938) is probably *Ceratothoa verrucosa* (タイノエ) because the only latter species occurs in the mouth cavity of *Pagrus major* in Japanese waters (Yamauchi 2009, 469-470; Yamauchi and Nunomura 2010). The monogenean has been reported to infect the mouth cavity of two seabreams (*Dentex tumifrons* and *P. major*) and sometimes the surface of isopods parasitizing the same site (Goto 1894; Yamaguti 1938, 1963).

Cyclobothrium iniistii Yarnaguti, 1937

Site: gills

Host: *Xyrichtys dea* (as *lniistius dea*, テンス)

Record: Yamaguti 1937 (unspecified locality, Seto Inland Sea)

Cyclobothrium semicossyphi Yamaguti, 1938
Site: gills
Host: *Semicossyphus reticulatus* (コブダイ)
Records: Yamaguti 1938, 1958 (unspecified locality, Seto Inland Sea)

Cyclobothrium sessile (Goto, 1894) Cerfontaine, 1895
Syn.: *Diclidophora sessile* Goto, 1894
Sites: mouth cavity, gills
Host: *Semicossyphus reticulatus* (as *Choerops japonicus*, コブダイ)
Records: Goto 1894 (Mitsugahama, Ehime [8]); Yamaguti 1934 (Tarumi, Hyogo [2])

Heterobothrium okamotoi Ogawa, 1991
Syn.: *Diclidophora tetrodonis* Goto, 1894
Site: gills
Host: *Takifugu rubripes* (トラフグ)
Records: Okamoto 1963 (unspecified locality, Seto Inland Sea); Okamoto and Ogasawara 1965 (unspecified locality, Seto Inland Sea)
Remarks: *Diclidophora tetrodonis* reported by Okamoto (1963) was regarded as *Heterobothrium okamotoi* by Ogawa (1991).

Neoheterobothrium hirame Ogawa, 1999
Site: buccal cavity wall
Host: *Paralichthys olivaceus* (ヒラメ)
Records: Yoshinaga et al. 2009 (unspecified locality, Wakayama [11]; unspecified locality, Oita [3]); Yamamoto et al. 2011 (eastern area of Hiuchi-nada and Bisan-Seto, Kagawa [9])

Megaloncus arelisci Yamaguti, 1958
Site: gills
Host: *Cynoglossus joyneri* (as *Areliscus joyneri*, アカシタビラメ)
Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)
Remarks: Mamaev and Lebedev (1979) treated *Megaloncus* as a junior synonym of *Anchorophorus* but did not transfer this species to the latter genus nor indicate any reasons for such synonymization. Following Yamaguti (1963), the original scientific name of the species is used in this paper.

Family Plectanocotylidae Monticelli, 1903

Octoplectanocotyla trichiuri Yamaguti, 1937
Site: gills
Host: *Trichiurus lepturus* (as *Trichiurus japonicus*, タチウオ)
Record: Yamaguti 1937 (unspecified locality, Seto Inland Sea)

Family Bychowskicotylidae Lebedev, 1969

Yamaguticotyla truncata (Goto, 1894) Price, 1959
Syn.: *Microcotyle truncata* Goto, 1894
Site: gills
Host: *Parapristipoma trilineatum* (as *Pristipoma japonicurn*, イサキ)
Record: Goto 1894 (Mitsugahama, Ehime [8])

Family Gastrocotylidae Price, 1943

Pseudaxine trachuri Parona and Perugia, 1890
Site: gills
Host: *Trachurus japonicus* (as *T. trachurus*, マアジ)
Record: Yamaguti 1938, 1942 (Tarumi, Hyogo [2])

Family Axinidae Monticelli, 1903

Axinoides aberrans (Goto, 1894) Price, 1946
Syn.: *Axine aberrans* Goto, 1894
Site: gills
Host: *Ablennes hians* (as *Tylosurus schismatorhynchus*, ハマダツ)
Record: Yamaguti 1934 (Tarumi, Hyogo [2])

Axinoides sebastisci Yamaguti, 1958
Syn.: *Axine* (*Axinoides*) *sebastisci* Yamaguti, 1958
Site: gills
Host: *Sebastiscus marmoratus* (カサゴ)
Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Zeuxapta japonica Yamaguti, 1963
Syn.: *Microcotyle seriolae* Yamaguti, 1940
Site: gills
Host: *Seriola lalandi* (as *Seriola aureovittata*, ヒラマサ)

Record: Yamaguti 1940 (Tarumi, Hyogo [2])

Remarks: Yamaguti (1963) proposed *Zexapta japonica* for this species because *Microcotyle seriolae* Yamaguti, 1940 is a junior homonym of *Z. seriolae* (Meserve, 1938).

Family Heteraxinidae Unnithan, 1957

Bicotyle reticulata (Goto, 1894) Tripathi, 1956

Syn.: *Microcotyle reticulata* Goto, 1894

Site: gills

Host: *Pampus punctatissimus* (as *Stromateus argenteus,* マナガツオ)

Record: Goto 1894 (Mitsugahama, Ehime [8])

Heteraxine heterocerca (Goto, 1894) Yamaguti, 1938

Syn.: *Axine heterocerca* Goto, 1894

Site: gills

Host: *Seriola quinqueradiata* (ブリ)

Records: Goto 1894 (Ujina Port, Hiroshima [4]; Mitsugahama, Ehime [8]); Yamaguti 1934, 1942 (Tarumi, Hyogo [2]); Yamaguti 1938 (unspecified locality, Seto Inland Sea)

Family Microcotylidae Taschenberg, 1879

Aspinatrium spari (Yamaguti, 1937) Yamaguti, 1963

Syn.: *Microcotyle spauri* Yamaguti, 1937

Site: gills

Host: *Acanthopagrus schlegelii* (as *Sparus longispinis*, クロダイ)

Record: Yamaguti 1937, 1942 (Tarumi, Hyogo [2])

Bivagina tai (Yamaguti, 1938) Yamaguti, 1963

Syn.: *Microcotyle tai* Yamaguti, 1938

Site: gills

Host: *Pagrus major* (as *Pagrosomus unicolor*, マダイ)

Record: Yamaguti 1938 (unspecified locality, Seto Inland Sea)

Microcotyle caudata Goto, 1894

Site: gills

Host: *Sebastes* sp. (as *Sebastodes inermis*, メバル属の1種)

Records: Goto 1894 (Mitsugahama, Ehime [8]); Yamaguti 1938 (unspecified locality, Seto Inland Sea)

Remarks: *Sebastes inermis* (= *Sebastodes inermis*) was currently separated into three species (*S. inermis*, *S. ventricosus*, and *S. cheni*) by Kai and Nakabo (2008), and it is unclear which species correnponds to Yamaguti (1938)'s host. Thus we use *Sebastes* sp. in this paper.

Microcotyle fusiformis Goto, 1894

Site: gills

Host: *Enedrias nebulosa* (as *Centronotus rubulosus*, ギンポ)

Record: Goto 1894 (Mitsugahama, Ehime [8])

Microcotyle gimpo Yamaguti, 1958

Site: gills

Host: *Enedrias nebulosa* (as *E. nebulosus*, ギンポ)

Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Microcotyle sebastisci Yamaguti, 1958

Site: gills

Hosts: *Sebastiscus marmoratus* (カサゴ), *Epinephelus akaara* (キジハタ), *Sebastes ventricosus* (as *Sebastodes güntheri*, クロメバル)

Record: Yamaguti 1958 (unspecified locality, Seto Inland Sea)

Microcotyle tanago Yamaguti, 1940

Site: body surface

Host: *Ditrema temmincki* (ウミタナゴ)

Records: Yamaguti 1940 (Tarumi, Hyogo [2]), 1958 (unspecified locality, Seto Inland Sea)

Ⅲ. Host-Parasite List

Copepoda

Caligus fugu (セトウオジラミ): *Udonella fugu* (body surface: Hiroshima)

Isopoda

Meinertia oxyrhynchaena (ソコウオノエ): *Choricotyle elongata* (dorsal surface: unspecified prefecture)

Elasmobranchii

Dasyatis akajei (アカエイ): *Heterocotyle chinensis* (gills: Hiroshima), *Monocotyle ijimae* (gills: Hiroshima)

Mustelus manazo (ホシザメ): *Squaloncocotyle laymani*

(gills: unspecified prefecture)

Squatina japonica (カスザメ): *Calicotyle mitsukurii* (cloaca: Ehime)

Actinopterygii

Acanthopagrus schlegelii (クロダイ): *Encotyllabe spari* (gills: unspecified prefecture), *Anoplodiscus spari* (fins: Hiroshima), *Haliotrema kurodai* (gills: Hiroshima), *Lamellodiscus japonicus* (gills: Hiroshima), *Lamellodiscus spari* (gills: Hiroshima), *Lamellodiscus takitai* (gills: Hiroshima), *Lobotrema spari* (gills, unspecified prefecture), *Aspinatrium spari* (gills: Hyogo)

Ablennes hians (ハマダツ): *Axinoides aberrans* (gills: Hyogo)

Conger myriaster (マアナゴ): *Benedenia epinepheli* (gills: unspecified prefecture)

Cynoglossus joyneri (アカシタビラメ): *Megaloncus arelisci* (gills: unspecified prefecture)

Ditrema temmincki (ウミタナゴ): *Murraytrematoides ditrematis* (gills, unspecified prefecture), *Microcotyle tanago* (gills: Hyogo)

Enedrias nebulosa (ギンポ): *Microcotyle fusiformis* (gills, Ehime), *Microcotyle gimpo* (gills, unspecified prefecture)

Engraulis japonica (カタクチイワシ): *Pseudanthocotyloides* sp. (gills, Ehime)

Epinephelus akaara (キジハタ): *Allobedenenia convoluta* (gills, unspecified prefecture), *Benedenia epinepheli* (gills: Hyogo), *Pseudorhabdosynochus epinepheli* (gills, Kagawa), *Pseudorhabdosynochus lantauensis* (gills, Hyogo), *Pseudorhabdosynochus satyui* (gills, Hyogo), *Microcotyle sebastisci* (gills, unspecified prefecture)

Epinephelus septemfasciatus (マハタ): *Metabenedeniella hoplognathi* (gills, Hyogo)

Inegocia japonica (イネゴチ): *Pseudohaliotrema thysanophrydis* (gills: Hyogo)

Lateolabrax japonicus (スズキ): *Dactylogyrus inversus* (gills: Hiroshima, Hyogo), *Dactylogyryus gotoi* (gills: Hiroshima), *Murraytrematoides lateolabracis* (gills: unspecified prefecture)

Lethrinus haematopterus (フエフキダイ): *Lethrinitrema lethrini* (gills: Hyogo)

Oplegnathus fasciatus (イシダイ): *Metabenedeniella hoplognathi* (gills, Hyogo)

Pagrus major (マダイ): *Benedenia sekii* (gills: Hiroshima), *Lamellodiscus pagrosomi* (gills: Hyogo), *Choricotyle elongata* (dorsal surface of *Meinertia oxyrhynchaena* in mouth cavity of *P. major*: unspecified prefecture), *Bivagina tai* (gills: unspecified prefecture)

Pampus argenteus (マナガツオ): *Bicotyle reticulata* (gills: Ehime)

Paralichthys olivaceus (ヒラメ): *Benedenia epinepheli* (gills: Hyogo), *Pseudamphibdella paralichthydis* (gills: unspecified prefecture), *Neoheterobothrium hirame* (buccal cavity wall: Kagawa, Oita, Wakayama)

Parapristipoma trilineatum (イサキ): *Yamaguticotyla truncata* (gills: Ehime)

Parupeneus chrysopleuron (ウミヒゴイ): *Haliotrema japonense* (gills: unspecified prefecture)

Rhyncopelates oxyrhynchus (シマイサキ): *Lepidotrema longipenis* (gills: Hyogo)

Sebastiscus marmoratus (カサゴ): *Axinoides sebastisci* (gills: unspecified prefecture), *Microcotyle sebastisci* (gills: unspecified prefecture)

Sebastes ventricosus (クロメバル): *Microcotyle sebastisci* (gills: unspecified prefecture)

Sebastes sp. (メバル属の1種): *Microcotyle caudata* (gills: Ehime)

Semicossyphus reticulatus (コブダイ): *Cyclobothrium semicossyphi* (gills: unspecified prefecture), *Cyclobothrium sessile* (mouth cavity, gills: Ehime, Hyogo)

Seriola lalandi (ヒラマサ): *Benedenia seriolae* (gills: unspecified prefecture), *Zeuxapta japonica* (gills: Hyogo)

Seriola quinqueradiata (ブリ): *Heteraxine heterocerca* (gills: Ehime, Hiroshima, Hyogo)

Siganus fuscescens (アイゴ): *Tetrancistrum sigani* (gills: Hyogo)

Takifugu niphobles (クサフグ): *Udonella fugu* (dorsal surface of *Caligus fugu* on *T. niphobles*: Hiroshima)

Takifugu rubripes (トラフグ): *Heterobothrium okamotoi* (gills: unspecified prefecture)

Trichiurus lepturus (タチウオ): *Octoplectanocotyla trichiuri* (gills: unspecified prefecture)

Xyrichtys dea (テンス): *Cyclobothrium iniistii* (gills: unspecified prefecture)

Ⅳ. Conclusion and future work

In total, 54 species of monogeneans are listed in this checklist. These species have been reported from 33 species of fishes (3 species of Elasmobranchii and 30 species of Actinopterygii) and 2 species of invertebrates from the Seto Inland Sea. Because over 400 species of fishes occur in this sea (Inaba 1988), more than 90% of them have not been investigated for their monogeneans. Especially, there is no information on monogeneans infecting gobiid species which accounts for nearly 10% of the fish fauna of the sea. More study is needed to clarify the monogenean fauna of the Seto Inland Sea.

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